Vertical ozone distribution measured over Ny Ålesund (70ºN, 12ºE) inside the polar vortex

Modelled ClONO$_2$ fields - strong mixing results in less ClO to destroy ozone

Importance of modelling dynamics correctly

Model with weak mixing

Model with strong mixing

Low

High

[Figures from UGAMP]
Gravity wave observations from CRISTA

Gravity wave observations from CRISTA

Predicted vertical wavelength \((\lambda_z)_{\text{theory}}\) versus measured \((\lambda_z)\) over South America at 20-30 km in November 1998 [Eckermann, Science 286, 1999].
Consistent vertical and horizontal resolution

Vertical and horizontal resolutions for satellite sounders and numerical models

[see Lindzen and Fox-Rabinovitz, Mon.Weather.Rev. 117, 2575-2583]
Simulations of low and high horizontal resolution

Simulation of N\textsubscript{2}O on the 2100 K isentropic surface from the SLIMCAT model (4 ppb contour interval).

Below: gridded simulated ISAMS and HIRDLS observations for modelled field for a 12 hour window centred on the observation time.

[Figure from Alan Iwi]

N\textsubscript{2}O, day 199, 12:00

ISAMS locations, t\textsubscript{o} +/- 6 hours

HIRDLS locations, t\textsubscript{o} +/- 6 hours